



DEPARTMENT OF SCIENCE
ADVANCED PLACEMENT CHEMISTRY
Mrs. Horgan

General Information

Instructor name: Andrea Horgan

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Textbook: *Chemistry, 7th ed.*

Zumdahl, Steven, and Susan Zumdahl

Houghton Mifflin, 2007.

In addition to the textbook, an A.P. Chemistry review book is **highly recommended.

Course Description

This AP Chemistry course is designed to be the equivalent of the general chemistry course usually taken during the first year of college. For most students, the course enables them to undertake, as a freshman, second year work in the chemistry sequence at their institution or to register in courses in other fields where general chemistry is a prerequisite. This course is structured around the six big ideas articulated in the AP Chemistry curriculum framework provided by the College Board. A special emphasis will be placed on the seven science practices, which capture important aspects of the work that scientists engage in, with learning objectives that combine content with inquiry and reasoning skills. AP Chemistry is open to all students who wish to take part in a rigorous and academically challenging course.

The Big Ideas	Chapter
Big Idea 1: Structure of matter.	1,2,3,7,19,20,21
Big Idea 2: Properties of matter – characteristics, states, and forces of attraction	5, 8,9,10,11
Big Idea 3: Chemical reactions	4,18
Big Idea 4: Rates of chemical reactions	12
Big Idea 5: Thermodynamics	6,17
Big Idea 6: Equilibrium	15,13,14,16

GRADING

The grading scale is as follows:

Grade	Percent
A	89.5-100%
B	79.5-89.4%
C	69.5-79.4%
D	59.5-69.4%
F	Below 59.4%

The grades will be divided as:

10% - Classwork/Homework

50% - Tests/Quizzes

40% - Labs

MAKEUP WORK

Makeup work will be given if the absence is excused. Students have as many days to make up the work as they were absent. For example, if a student was absent for 3 days, he/she has 3 days to make up the work missed.

If a student is suspended by the administration for any reason, make up work WILL NOT be given to the student. He/she will receive zero credit for any work and/or tests that were missed during the suspension.

LATE WORK

Any late work that is turned in after the due date (that does not qualify as makeup work) will be given half credit.

DAILY AGENDA

Warm up: the class will usually start with a warm up question. The warm ups will be turned in at the end of two weeks and be worth 50 points.

Homework check: Students will be given a stamp sheet at the beginning of each unit/chapter. Students will be expected to keep this stamp sheet and turn in on the day of the test. A stamp will be given if the homework is complete and turned in on time.

Daily lesson/lab: Lessons and labs will be based on the unit of study and will include lecture, group work, independent study and group labs.

CLASS RULES AND EXPECTATIONS

- 1. Do only those things which allow you and others to learn.**
- 2. Bring materials necessary for learning.**
 - a.** Please bring textbooks to class on the days assigned.
 - b.** Bring a pen/pencil and paper to class.
 - c.** Labs must be written on graph paper or typed.

- d. You do not need a separate chemistry binder.
- 3. No food or drinks**
 - a. Because of the nature of the course and exposure of chemicals, food and drinks will not be allowed. Students may bring a water bottle.
- 4. Respect teacher and classmates.**
- 5. Arrive on time.**
 - a. Any tardies will result in an after school detention issued by the administration.

AP Chemistry Unit Overview

UNIT 1 – ATOMIC THEORY (4 WEEKS)

1. History of the Atomic Theory
2. Isotopes
3. Average atomic mass
4. Mass %
5. Waves and light
6. Quantum theory
7. 1st ionization energy
8. Shell model
9. PES
10. Shielding effect
11. Orbitals
12. Electron configuration
13. Atomic and Ionic Radii
14. Ionization Energy
15. Electronegativity
16. Naming ionic compounds
17. Naming covalent compounds
18. Naming acids/bases
19. The Mole
20. Stoichiometry
21. Limiting Reactant
22. % yield
23. Empirical and Molecular Formula

UNIT 2 –CHEMICAL BONDING (4 WEEKS)

1. Octet rule
2. Ionic/covalent bonding
3. Lewis diagrams
4. Exception to octet
5. Formal charge
6. Bond energy/length
7. Resonance structure
8. VSEPR theory
9. Valence bond theory
10. Hybrid orbital theory
11. Multiple bonds
12. Polarity
13. Atomic Emission Spectrums
14. Molecular orbital theory
15. UV/Vis Spectroscopy

UNIT 3 – CHEMICAL REACTIONS (2 WEEKS)

1. Electrolytic Solutions
2. Solubility
3. Precipitation reactions
4. Redox reactions
5. Oxidation number
6. Balancing equations
7. Balancing redox reactions
8. Activity series
9. Halogen displacement reaction
10. Combustion reaction
11. Redox reactions

UNIT 4 – THERMODYNAMICS (2 WEEKS)

1. Heat vs. Temperature
2. Enthalpy and work
3. Endothermic and exothermic reactions
4. Average bond enthalpy
5. Calorimetry
6. Hess's law
7. Enthalpy of formation
8. Entropy
9. Free energy

UNIT 5 – EQUILIBRIUM (3 WEEKS)

1. Equilibrium constants K_{eq} , K_c , K_p
2. Reaction Quotient (Q)
3. Le Chatelier's principle
4. Manipulating K_{eq} and Q
5. Gibbs free energy and equilibrium

UNIT 6 - ELECTROCHEMISTRY (1 WEEK)

1. Voltaic (galvanic) cells
2. Voltage
3. Standard reduction potentials
4. Standard cell potential
5. Thermodynamically favored redox reactions
6. Gibbs free energy
7. Concentration cells
8. Electrolytic cells

UNIT 7 – INTERMOLECULAR FORCES (2 WEEKS)

1. Types of Intermolecular Forces
2. Determining relative boiling points
3. Heat of fusion
4. Heat of vaporization
5. Vapor pressure
6. Surface tension/viscosity
7. Polymers
8. Amorphous and crystalline solids
9. Unit cells

10. Molecular solids
11. Covalent network solids
12. Metallic solids

UNIT 8 – SOLUTIONS (1 WEEK)

1. Types of solutions
2. Expressing concentration
3. Solubility and structure
4. Solubility of solids and temperature
5. Solubility product constant (K_{sp})
6. Predicting precipitates
7. Solubility of gases

UNIT 9 – GASES (3 WEEKS)

1. Pressure
2. Gas laws
3. Ideal gas law
4. Partial pressures
5. Mole fractions
6. Real vs ideal

UNIT 10 – ACIDS/BASES (4 WEEKS)

1. Defining acids and bases
2. Conjugate pairs
3. Strengths of acids and bases
4. Autoionization of water
5. pH and pOH of strong acids and bases
6. K_a and K_b
7. pH of weak acids/bases
8. Polyprotic acids
9. Acid/Base reactions
10. pH and soluble salts
11. Common ion effect
12. Buffered solutions
13. Solubility and pH
14. Acid/Base titration

UNIT 11 – KINETICS (2 WEEKS)

1. Reaction rates
2. Order of reactions
3. Rate laws
4. Integrated rate laws
5. $\frac{1}{2}$ life reactions
6. Factors affecting reaction rates
7. Activation energy E_a
8. Reaction mechanisms
9. Catalysis

UNIT 12 – AP TEST REVIEW (2 WEEKS)